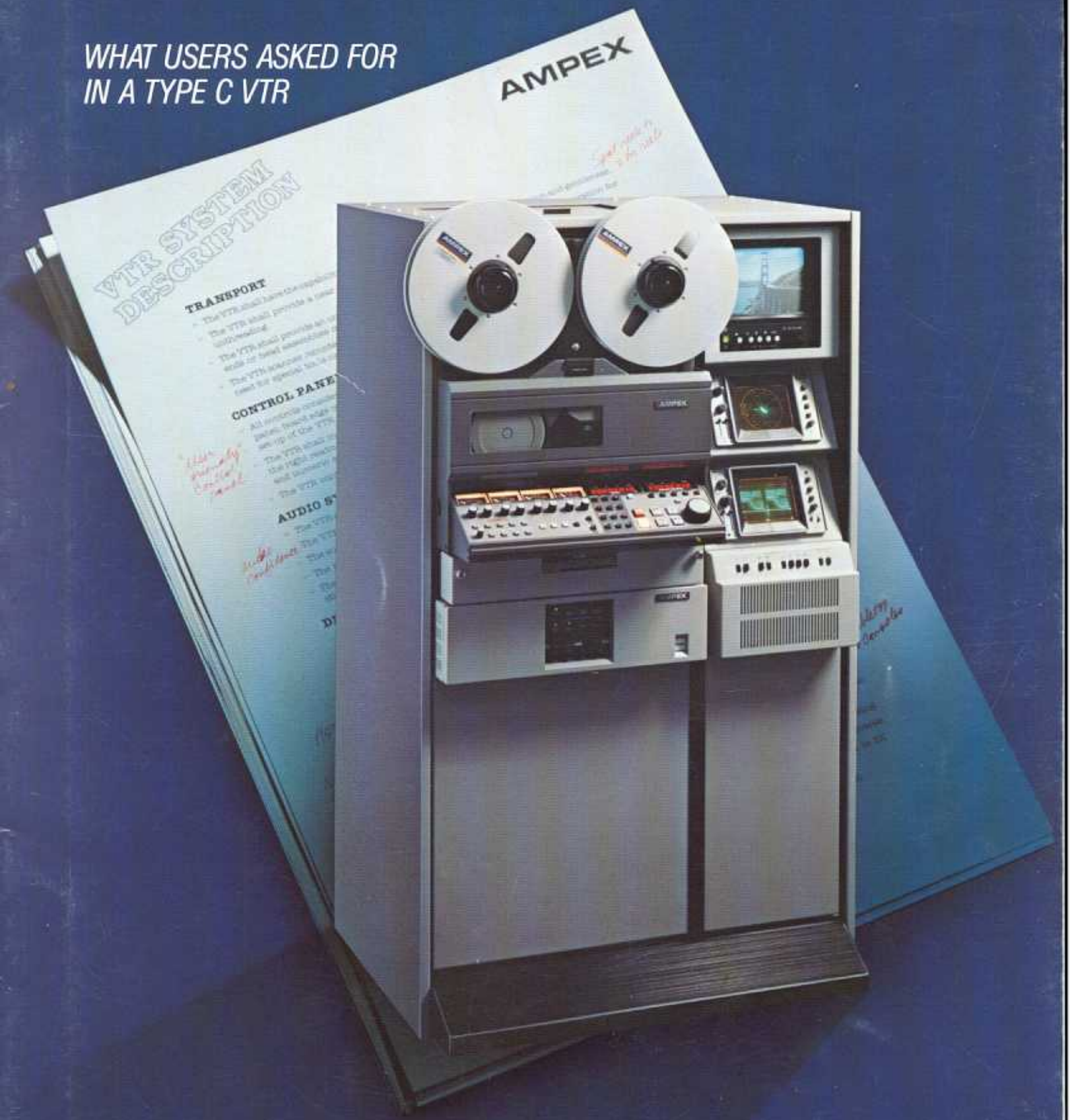
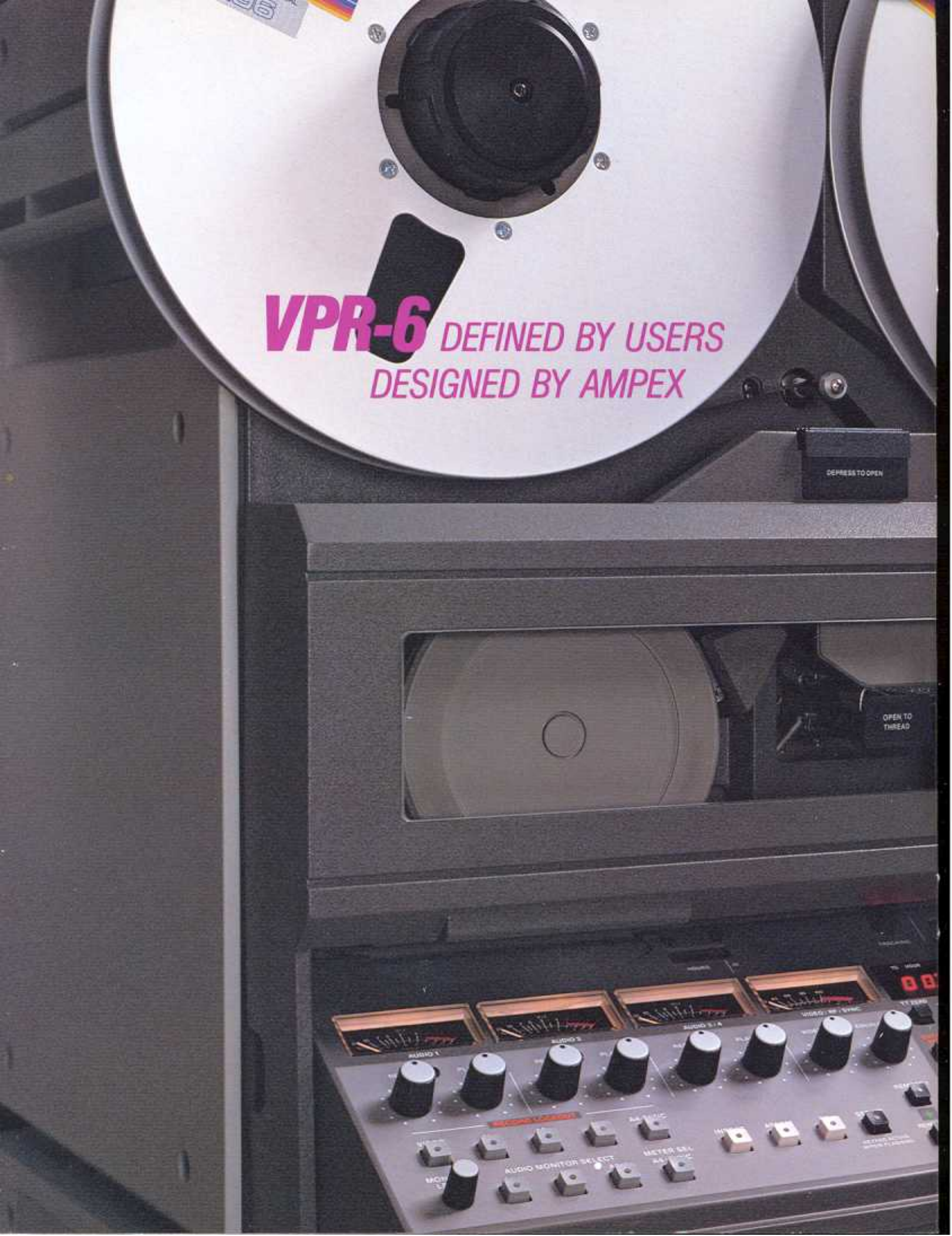
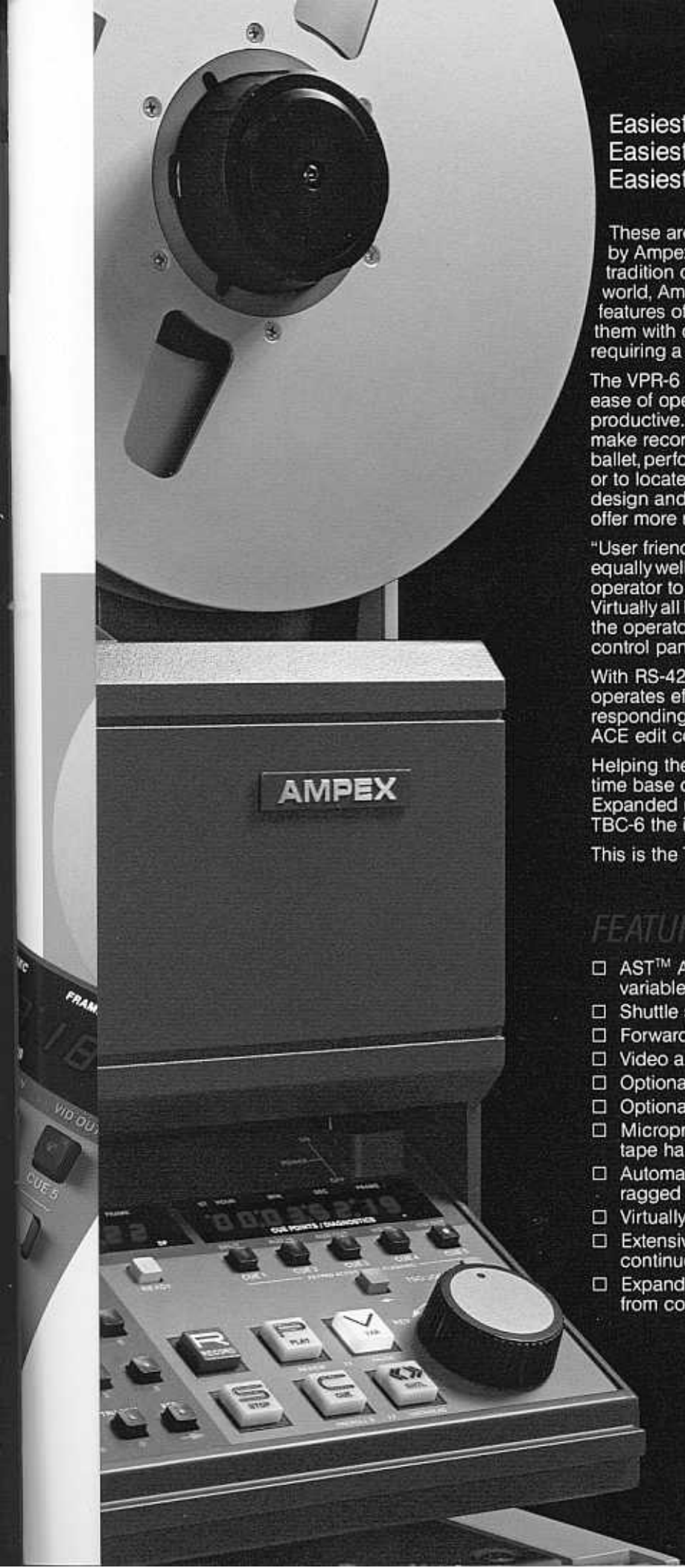
VPR-6

WHAT USERS ASKED FOR IN A TYPE C VTR



AMPEX


VPR-6 DEFINED BY USERS
DESIGNED BY AMPEX
DEPRESS TO OPEN
OPEN TO THREAD



Easiest to operate.
Easiest to maintain.
Easiest to diagnose.

These are some of the design goals set and accomplished by Ampex for the new VPR-6, the latest in the unparalleled tradition of Ampex VTRs. After listening to users all over the world, Ampex has combined in the VPR-6 the strongest features of other VTRs in its product line, and enhanced them with other benefits that make it ideal for applications requiring a VTR in the most popular price-performance range.

The VPR-6 is an appealing blend of machine intelligence and ease of operation, combined to allow operators to be more productive. Powerful microprocessors help the operator to make recording and playback operations as smooth as a ballet, perform simple or complex editing steps with equal ease, or to locate a troublesome IC if necessary. The mechanical design and packaging, based on proven Ampex designs, offer more reliability and greater accessibility.

"User friendly," a term often applied to computers, applies equally well to the VPR-6. A well laid out control panel allows the operator to easily access the logical and powerful software. Virtually all board edge controls have been eliminated, allowing the operator to perform machine setup procedures from the control panel.

With RS-422 serial communications capability, the VPR-6 operates efficiently as an element of state-of-the-art systems, responding to computer editing systems such as the Ampex ACE edit controller.

Helping the VPR-6 attain its full potential is the TBC-6 digital time base corrector, performance matched to the VPR-6. Expanded memory and a very compact package make the TBC-6 the ideal companion for the VPR-6.

This is the Type C VTR you asked for. Now Ampex delivers it.

FEATURES

- ☐ AST™ Automatic Scan Tracking is standard, allowing variable play speeds −1 to 3X normal
- ☐ Shuttle speeds approaching 500 ips with viewable picture
- ☐ Forward and reverse single-frame jog
- ☐ Video and audio confidence playback
- ☐ Optional sync channel
- ☐ Optional fourth audio channel (EBU systems)
- ☐ Microprocessor-controlled optimization of servos for gentle tape handling of all reel sizes from spot to 2 hours
- ☐ Automatic unthread mode prevents head breakage from ragged tape ends
- ☐ Virtually all machine functions can be run from control panel
- ☐ Extensive built-in diagnostics monitor VTR status continuously
- ☐ Expanded diagnostic routine utilizing test probe can be run from control panel

Ampex listened to users worldwide describe the ideal VTR control panel. You wanted all operator controls up front and a minimal number of board edge controls. You asked for controls to be grouped logically by function. You said you needed the sophistication of software control, but you insisted that the VTR be user-friendly. Ampex listened . . . and designed the control panel you wanted.

1 METERING/MONITORING

Audio level control – Three independent audio channels have unity detented input and output level controls (fourth channel EBU option). The dual scale meters are selectable for VU or PPM response.

Video level control and indication – Monitors playback video/sync RF level or input level. Meter function (sync or video) is established by the METER SEL switch.

Record Lockouts – Selects video and/or audio channels for recording or inhibiting.

Audio Monitor Select – This group of controls allows any channel or combination of channels to be monitored on the integral speaker or headphone jack.

2 KEYPAD CONTROLS

INSERT/ASSEM – enables insert or assemble editing

EE – switches output between tape and input signal

SET UP – allows operator to select special machine setup modes via the numeric keypad

REM 1/REM 2 – Remote 1 enables parallel, serial or simple remote control; Remote 2 enables multi-VTR mode (for auto editing).

+/– switches – When the numeric keypad is active, these switches can be used to trim an edit point by any number of frames.

The primary function of the keypad cluster of buttons is labelled above the button:

TT Zero – zeroes the tape timer
TCR – displays time code in numeric display
AUTO – enables auto edit (two-machine editing)
EDIT OPT – rephases scanner to on-tape video signal for perfect interchange edits
SERVO/FAULT/SYSTEM LED'S – indicate an unlocked servo, machine fault or non-standard system condition
CHROMA MAN – permits manual control of video response (equalization)
CLR FMR INVERT – Permits operator control of automatic color framing circuitry
REC LOCK – master record lockout
MARK – enters tape time or time code into cue point register
TRU FRM – enables true frame playback mode between stop and 2 times play speed
XFR – transfers data from one cue point register to another

The keypad switches are used for numeric entry only when SET-UP or one of the CUE/EDIT POINT switches are selected.

3 DUAL NUMERIC DISPLAYS

Display of VPR-6's operational status is enhanced by the use of dual numeric

Control Where You Want It

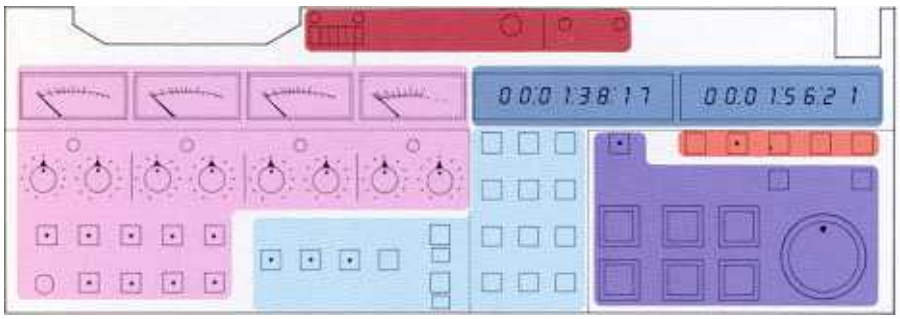


readouts – one for tape time or time code; and the second for edit/cue point values, percentage of play speed, keypad input, setup codes, servo status and system fault and diagnostic codes.

4 TRANSPORT CONTROLS

READY – turns on scanner

RECORD – initiates record mode



STOP – overrides all other mode commands

PLAY – initiates playback; pressing switch twice initiates review mode when VTR is in auto edit mode

CUE – automatically cues tape to selected cue point with preroll; pressing switch twice cues tape to a second programmable preroll point

VAR – initiates variable speed playback over a range of –1 to 3X normal speed; pressing switch twice allows tape to pause

SHTL – initiates shuttle mode over a range of nearly 500 ips in reverse or forward direction

TRANSPORT CONTROL KNOB – varies tape speed in shuttle or variable play modes

TSO/JOG – tape speed override functions in play mode to vary tape speed by 7%. Single frame jog functions in any STOP mode.

5 EDIT/CUE POINTS

These switches provide access to five independently selectable registers, storing five individual cue point values.

Additionally, if the VPR-6 is in AUTO edit mode, these switches serve as audio and video in and out edit points allowing a split edit to be set up quickly.

6 SECONDARY CONTROLS

Head Hour Meter – indicates cumulative number of hours that scanner has been on with tape tensioned

Tracking – provides adjustment of capstan servo to align center of track video head (in non-AST or edit mode)

Video/Sync Rec RF level – allow RF level to be set



MORE CAPABILITIES TO INCREASE EFFICIENCY

Editing Made Simple

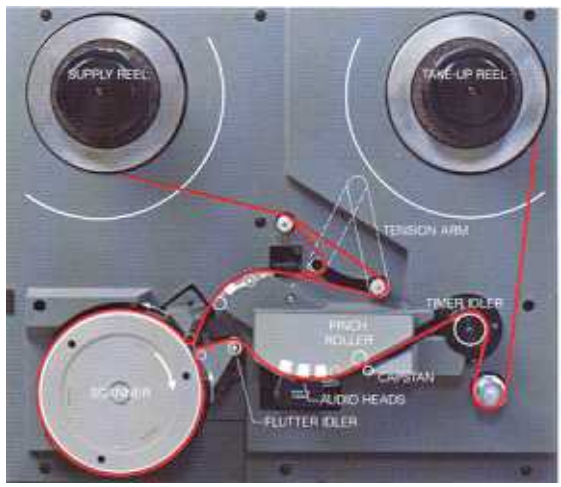
VPR-6 makes "stand-up" two-machine editing simpler than ever. Built-in machine intelligence guides the operator through the editing process and alerts the operator to any conditions which will detract from the quality of the edited program. The editing features of the VPR-6 include:

- ☐ Pushbutton selection of insert or assemble modes
- ☐ Auto-Edit permits editing from pre-selected cues
- ☐ Edit optimize mode automatically rephases scanner tach to on-tape video signal for perfect interchange edits
- ☐ Pushbutton selection of entrance and exit edit points off tape
- ☐ Keypad entry of edit points and edit duration
- ☐ Pushbutton display of edit duration
- ☐ Auto tag feature transfers old exit point to new entrance point and recomputes duration
- ☐ "Split" button allows audio and video channels to be edited separately
- ☐ "XFR" button allows contents of any edit point register to be quickly transferred to another register
- ☐ Preview mode permits rehearsal of video and audio edits prior to edit recording
- ☐ "+/– buttons permit edit point to be trimmed by any number of frames
- ☐ "JOG" buttons allow single frame jog in either direction for precise pinpointing of edit points
- ☐ Continuous diagnostic system warns of many non-standard conditions which can affect edit, such as:
 - "not color framed"
 - "excessive edit phase error"
 - "auto record – editor off"
 - "exit before entr"
 - "cue point not found"
 - "not cued"
 - "not synchronized"

Power-Down Memory

If power fails, a backup battery and voltage regulator system continues to supply power to the memory system. When power is restored, setup codes, edit and cue points, tape time and editor configuration all return as they were at the time of power interruption.

The clean, uncluttered transport of VPR-6 allows easy tape threading.





Superior Audio Performance

The VPR-6 audio system is designed to meet the ever-increasing needs of the broadcasting, production and post-production environments and includes those features requested by most users.

Just a few of the audio features of the VPR-6 are:

- ☐ full audio confidence monitoring on all longitudinal tracks
- ☐ optional EBU 4th audio channel
- ☐ dual channel stereo monitoring
- ☐ adjustable azimuth alignment for stereo playback
- ☐ new anti-stiction, long wearing audio head stacks
- ☐ excellent crosstalk performance
- ☐ selectable peak or VU metering response
- ☐ audio processing ports for interface with noise reduction or compression/expansion devices
- ☐ integral speaker and headphone jack
- ☐ dual channel high fidelity audio monitoring in overhead bridge console configuration

Automatic Scan Tracking Is Standard

Perfect pictures begin with Ampex's exclusive AST™ Automatic Scan Tracking system. A standard feature of the VPR-6, this Emmy award-winning development enables broadcast quality pictures in stop motion or at any play speed from 1 times reverse to 3 times forward speed.

Automatic Scan Tracking also enables accurate tracking to be maintained at non-standard tape speeds, thus eliminating noise bars (cross-tracking) in the picture. The AST feature provides added insurance against imperfect recordings by automatically servoing the video head to remain constantly centered on the recorded video track.





GENTLE TAPE HANDLING

The intelligent servo system of the VPR-6 allows equally gentle handling of any reel sizes up to 2 hours (11¾"). Shuttling and cueing routines are optimized for a particular reel size to ensure optimum tape handling.

Automatic protection modes provide safe handling of the tape under extreme conditions. For instance, if either reel motor fails, the VPR-6 defaults to the stop mode to prevent any tape damage. In the case of a power failure, the reel motors are dynamically braked to avoid severe changes in tape velocity.

TBC-6 . . . Full Performance Digital Time Base Correction For 'C' Format Direct or Heterodyne Processing



PERFORMANCE MATCH FOR VPR-6

The TBC-6 was designed with two principal goals in mind. First, companionship with the VPR-6 videotape recorder. To achieve this perfect match, the TBC-6 was required to provide the ultimate in reliability and consistency of performance over a wide range of timebase error inputs.

With the VPR-6, the TBC-6 delivers broadcast-stable, disturbance free variable motion playback . . . from 1 times reverse to 3 times forward play speed. In shuttle, the TBC-6's error processing circuitry provides viewable pictures at speeds approaching 500 ips, in both forward and reverse.

A second goal of the TBC-6 design was to provide professional quality heterodyne video processing for capstan servoed ½" and ¾" ENG/EFP recorders. The TBC-6 can even time-share playback correction between the VPR-6 and heterodyne recorders allowing maximum use of your equipment when dubbing up from ENG equipment to the one-inch "C" format.

DESIGNED-IN ADVANTAGES

TBC-6 uses 4 XFsc A/D sampling, with 8 bits of amplitude accuracy for transparent conversion to digital processing. The memory size of 32 horizontal lines provides a wide correction window (28 lines) for slow motion playback and even the wildest gyroscopic errors from ENG portable recorders.

Full color dropout compensation and a line-by-line velocity error corrector are built in and included as standard on all units. The TBC-6's SCH phased sync generator includes fully adjustable horizontal and vertical blanking circuitry.

SCH PHASE STABILITY

The TBC-6's SCH phase sync generator is designed to meet RS-170A standards and includes fully adjustable horizontal and vertical blanking circuitry. Using the stability of an SCH-phased design, automatic vertical centering circuitry ensures consistent and repeatable picture positioning. An edit-ready LED indicator is included to confirm off-tape color frame accuracy.

FULL ADJUSTMENT RANGE

The TBC-6's output processing circuitry provides a full range of adjustment of composite video signal amplitudes, including independent video and chroma gain controls, chroma phase, subcarrier phase, horizontal phase and black level controls.

DESIGNED FOR EASY MAINTENANCE

While the TBC-6 is designed for long-term, drift-free operation, maintenance access is made easy should servicing be required. The TBC-6 uses a bus-structured backplane motherboard for interconnecting the four PWA's. This unique design permits fully interchangeable card slot positions. In the case of a fault, the suspected PWA is moved to the top card position, making troubleshooting of individual components extremely simple.

DESIGNED-IN RELIABILITY

The VPR-6 transport is built upon proven designs. It begins with an aluminum alloy casting that mounts to the chassis side panels for exceptional structural support and rigidity. Torsional deflection is virtually eliminated. Mechanical components are discrete subassemblies, pre-tested and individually adjustable. Each is precisely indexed to the front surface of the base casting.

The tape path is optimized for wide range use, from spots to two hours. Take-up and supply reels are both "A" wind, and the scanner is located at the lower left of the transport, permitting easy access to tape path components.

Reel Motors — Arrangement of the large, high-torque dc reel motors offers the benefit of two-hour recording on 11¾ inch NAB reels. Yet the high-response servo will handle the lightest "spot" reels with equal gentleness. Microprocessor control allows the VPR-6 to adapt instantly and automatically to the proper tape handling speed. Both motors contain bi-directional tachometers and permit shuttle speeds approaching 500 ips, with rapid acceleration, while preserving the system's gentle tape handling characteristics.

Tape Tension — A high storage, low mass tension arm responds quickly and smoothly to transitions between Play, Stop and Shuttle modes. Only one tension setting is required. All further tensioning is microprocessor controlled.

Video — The scanner features a brushless dc motor for reliable performance and quiet operation. Heads are quickly replaced and the scanner design permits easy access and servicing of record electronics.

Audio — New anti-stiction, long-wearing audio head stacks are easy to remove and replace. The head base is adjustable for optimum stereo playback. Record/Play heads have an external shield system for noise immunity and a hinged door for easy threading.

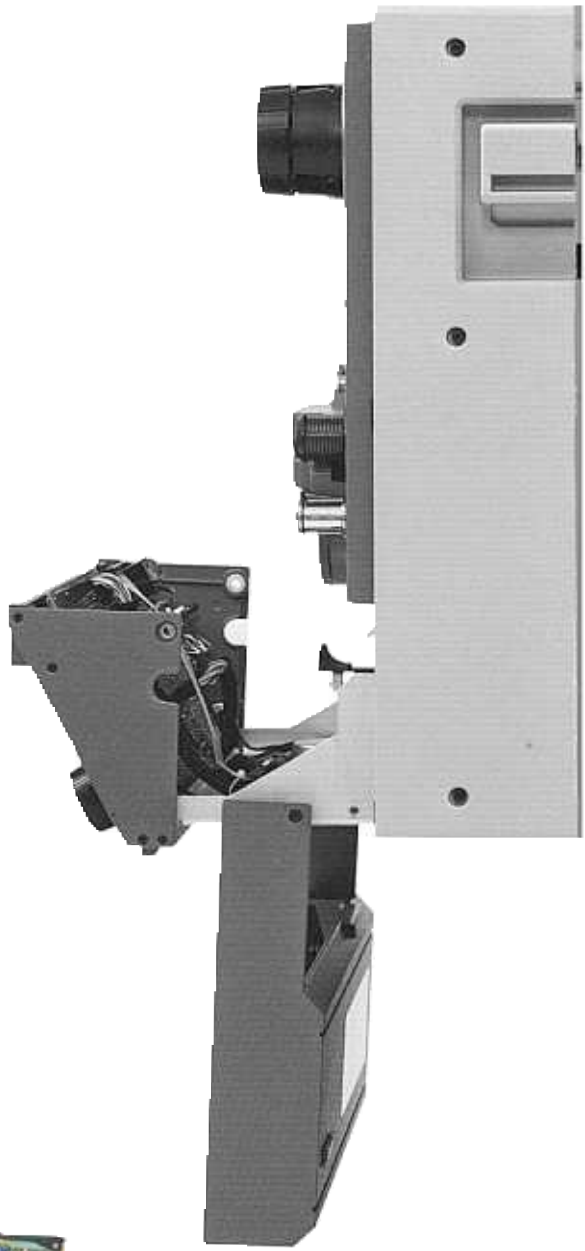
Capstan — The capstan and direct drive motor assembly is an integral assembly containing a high resolution tachometer and flywheel. The microprocessor-controlled servo subsystem produces smooth slow motion and rapid play lock-up.

MAINTENANCE HAS NEVER BEEN EASIER

The VPR-6 is designed to be reliable but also easy to maintain. Top doors provide access to the audio system and major plug-in printed wiring assemblies. For added convenience, all primary test points and setup controls are located on the top edges of the PWA's, which are serviceable with an extender board. Even in tight spaces such as mobile vans, access to rear mounted components and electronics is enhanced by the use of an accessory pivotable slide tray.

The entire rear door assembly hinges open for access to the power system, transport, harnessing and audio electronics. Even the control panel hinges open for easy access. The power supply is mounted on a slide-out tray for serviceability, and all transport assemblies can be serviced easily due to the quick-removal one-piece transport trim.

Electronic harnesses have been virtually eliminated in favor of more reliable printed wiring boards and backplane connectors. The control panel connects to the system with flat ribbon cable.



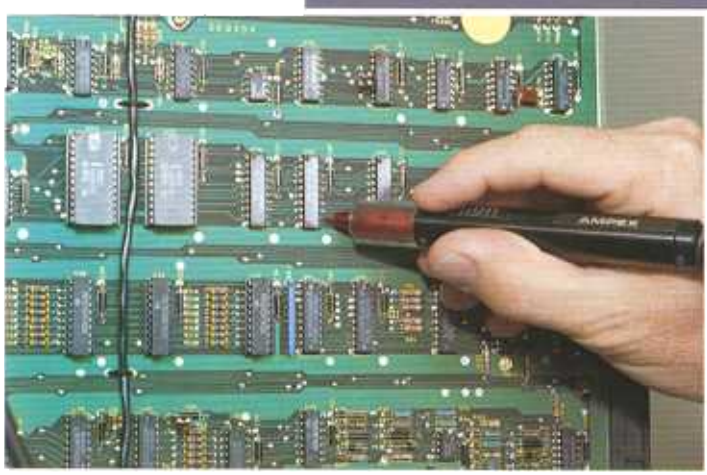


ADVANCED SELF DIAGNOSTICS

The power of microprocessors allows a more sophisticated level of fault detection than previously possible in a videotape recorder. During initialize sequence and normal operation, the VPR-6 is constantly checking machine status. A non-standard or fault condition will be indicated either by the system or fault warning LED switches on the control panel. When either of these switches is depressed, an error code appears in the cue point/diagnostics display. In the case of multiple faults, a stack of up to four fault codes is created. The VPR-6 will automatically shut down if the problem could cause tape damage or make the machine otherwise inoperable.

In this example, 103-01, the three digits "103" indicate a servo PWA fault and the "-01" indicates "arm out of window," which means that the tension arm is not within the normal tension range.





EXPANDED DIAGNOSTICS

A hand-held diagnostic probe along with a special diagnostic program allow a technician to easily examine every integrated circuit which is in direct communication with the two microprocessors. This powerful tool precludes the need for expensive external test equipment and technical knowledge of microprocessor electronics.

VPR-6 SPECIFICATIONS

VIDEO AND SYNC	NTSC/PAL-M 525/60	PAL/SECAM 625/50
Bandwidth	Flat to 4.2 MHz ±0.5 dB −3 dB at 5.0 MHz	Flat to 5.0 MHz ±0.5 dB −3 dB at 6.0 MHz
S/N (Rhode & Schwarz unweighted with bandpass filter) using TBC-6	−46 dB peak-to-peak video to RMS noise on interchange basis	−43 dB peak-to-peak video to RMS noise on interchange basis
LF Linearity	2% blanking to white (maximum)	2% blanking to white (maximum)
Differential Gain	4% blanking to white (maximum)	4% blanking to white (maximum)
Differential Phase (40 IEEE units of subcarrier through TBC-6)	4 degrees at 3.58 MHz off-tape (max)	4 degrees at 4.43 MHz off-tape (max)
Chrominance/Luminance Delay	20 nsec (maximum)	25 nsec (maximum)
2T $\sin^2$ Pulse & Bar	1% K-factor maximum	1% K-factor maximum
Moire	−40 dB color bars 75% amplitude 3.58 MHz subcarrier	−36 dB color bars 75% amplitude 4.43 MHz subcarrier
AUDIO (Channels 1, 2 & 3)		
Frequency Response (400 Hz Ref) 100 nWb/m reference level	±1 dB 200 Hz to 12 KHz ±2 dB 50 Hz to 18 kHz	±1 dB 200 Hz to 12 KHz ±2 dB 50 Hz to 18 kHz
S/N (with respect to 8 dB above reference level) 20 Hz to 20 KHz	56 dB Audio 1 and 2 54 dB Audio 3 (note 1) ANSI "A" weighted 60 dB	56 dB Audio 1 and 2 54 dB Audio 3 & 4 (note 1) CCIR/ARM weighted 60 dB
Distortion (measured at 1 KHz) (3 HD) at 100 nWb/m reference level (+8 dBu) at 251 nWb/m peak level (+16 dBu) With predistortion at 200 nWb/m (+14 dBu)	 1% maximum 3% maximum 1% maximum	 1% maximum 3% maximum 1% maximum
Depth of erasure on its own recording	−70 dB	−70 dB
Wow & Flutter	.08% NAB unweighted	.10% DIN weighted
Playback Crosstalk (Audio 1 & 2) 1 KHz referenced to +8 dBm or 100 nWb/m	−60 dB maximum	−60 dB maximum
SIGNAL INPUTS		
Video Input (75 ohm) BNC	0.5 to 2 volts peak-to-peak	0.5 to 2 volts peak-to-peak
Ref Video (75 ohm BNC) Comp sync Comp video	 0.7 to 4 volts 0.5 to 2 volts	 0.7 to 4 volts 0.5 to 2 volts
Audio line inputs	−14 dBu to +24 dBu	−14 dBu to +24 dBu
Impedance	balanced; 50 K ohm 50 Hz to 15 KHz	balanced; 50 K ohm 50 Hz to 15 KHz
SIGNAL OUTPUTS		
Video Output (75 ohm) BNC	1.0 Volt peak-to-peak	1.0 volt peak-to-peak
Audio Line Outputs	+8 dBu nominal; balanced +25 dBu maximum	+8 dBu nominal; balanced +25 dB maximum
Impedance	less than 50 ohms	less than 50 ohms
Headphone Audio Monitor	0 dBm to drive 600 ohms	0 dBm to drive 600 ohms
Audio Meter Circuits Switchable VU or PPM (EBU)		
GENERAL		
Record Time	124 minutes nominal; 6000 feet of tape on 11¾" reel	124 minutes nominal; 6000 feet of tape on 11¾" reel
Shuttle Time	less than 100 sec. for 60 minute tape	less than 100 sec. for 60 minute tape
Tape Timer Accuracy (control track updated)	±1 frame with continuous control track	±1 frame with continuous control track
Tape Speed	244 ±0.5 mm/sec 9.606 ±0.02 in/sec	239.8 ±0.5 mm/sec 9.44 ±0.02 in/sec
Video Writing Speed	1009 in/sec nominal	843 in/sec nominal
FM Carrier Frequencies	7.9 MHz blanking 10.0 MHz peak white	7.68 MHz blanking 8.9 MHz peak white
Audio Equalization	15 microseconds 3180 microseconds	15 microseconds
Lock-up Time from Ready Mode (color framed)	3 seconds	3 seconds

PHYSICAL DIMENSIONS

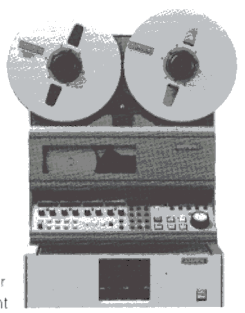
	Rack Mount	Table Top	Consolette with Monitoring	Side Car Monitoring Console	Overhead Monitoring Console
Height	21.0 in 533 mm	22.0 in 558.8 mm	70.5 in 1791 mm	56.4 in 1433 mm	74 in 1880 mm
Width	19.0 in 482.6 mm	22.0 in 558.8 mm	22.0 in 558.8 mm	33.0 in 838 mm	33.0 in 838 mm
Depth	21.0 in 533 mm	22.0 in 558.8 mm	26.5 in 673 mm	26.5 in 673 mm	26.5 in 673 mm
Weight	143 lb 65 kg	150 lb 68 kg	317 lb 144 kg	545 lb 247 kg	670 lb 304 kg

TEMPERATURE & HUMIDITY	
Temperature Humidity	0-45° C 10%-90% RH (non-condensing)
POWER INPUT	
Power Line Frequency Input voltages Input Current (Table Top)	50 & 60 Hz, single phase 100 / 110 / 120 / 130 Volts AC ±10% 200 / 220 / 240 / 260 Volts AC ±10% 115 vac Nominal 5.0A 230 vac Nominal 2.5A

Note 1: Audio 3 channel has wide-band capability for time code (S/N WB-30 dB)
Note 2: All specifications are based on Ampex 196 Tape or equivalent.

Ampex reserves the right to make product and specification changes at any time without notice

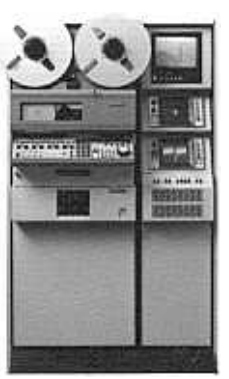
CONFIGURATIONS



Tabletop or Rackmount



Consolette



Sidecar Console



Overhead Bridge Console

VPR-6 ACCESSORIES AND OPTIONS

A number of accessories and options are available from Ampex to expand the operational capabilities of the VPR-6. These include:

SYNC CHANNEL

An option to permit all vertical sync information to be recorded according to the SMPTE/EBU Type "C" formats. The sync channel is a full video bandwidth channel allowing recording and playback of the full video synchronizing information when required.

FOUR CHANNEL AUDIO

This EBU option provides a fourth high quality audio channel in the track space normally allotted to the sync channel.

AUDIO PROCESSING KIT

This kit provides a harness and connectors to allow simple interfacing of the VPR-6 to external processing devices such as noise reduction modules or program compression/expansion accessories.

RACK SIZE MONITORING

A compact, rack mountable monitoring assembly is available for use with the VPR-6. Space is provided for a 9" picture monitor, a waveform monitor, and a vectorscope. An integral monitor switcher provides the ability to select from several waveforms and is switchable between two VPR-6 systems.



TIME CODE GENERATOR/READER & CHARACTER DISPLAY

A printed wiring assembly plugs into the VPR-6 electronics bay to add longitudinal time code generation and reading capability. Total control of the reader, generator and character display is available from the control panel of the VPR-6. User bits, time code parity bit, and time code color frame flag are just a few of the features of the time code generator. The character display capability includes time code, user bits, tape time and both entrance and exit edit points.

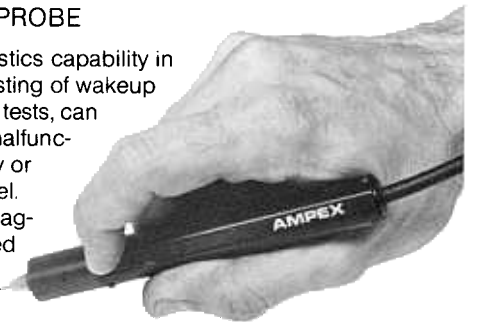
PARALLEL REMOTE INTERFACE PWA

Installation of this accessory adds a 75-pin remote connector which is pin-compatible with Ampex VPR-2B's and VPR-80's.

SERIAL REMOTE INTERFACE PWA

Installation of this PWA provides RS-422A-compatible connection to the serial control bus of a microprocessor-based editing system.

DIAGNOSTIC PROBE



Standard diagnostics capability in the VPR-6, consisting of wakeup and background tests, can identify system malfunctions to assembly or subassembly level. The accessory diagnostic probe, used in conjunction with an instruction manual, allows the maintenance engineer to diagnose all of the integrated circuits which are in communication with the microprocessors.



SMC-100

The traditional sports slow motion controller provides full variable speed playback control of the VPR-6 from up to 100 feet away.



STC-100

This multi-point search-to-cue accessory provides up to 99 cue point assignment and search capability. All cues can be recorded on tape for later recall.

AMPEX Ampex Corporation, Audio-Video Systems Division

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Bethesda
NEW JERSEY
(201) 825-9600
Allendale
(212) 947-8633
New York
TEXAS
(214) 960-1162
Carrollton
UTAH
(801) 487-8181
Salt Lake City
WASHINGTON
(206) 251-8682
Kent
AUSTRALIA
(02) 887-3333
North Ryde, NSW
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COLOMBIA
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Bogota
FRANCE
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Paris
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(069) 60580
Frankfurt (Main)
HONG KONG
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Kowloon
ITALY
(06) 55461
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(91) 241-0919
Madrid
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SWITZERLAND
(037) 81.31.11
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Reading, Berks.
VENEZUELA
782-3255
Caracas